CLAIMS:

1. A transition circuit converting the transmission path of a microwave in a direction either from a waveguide to a microwave transmission line or from a microwave transmission line to a waveguide, said transition circuit comprising:

a waveguide having a notched portion formed by cutting away a portion of the wall of the waveguide from the end portion thereof;

a dielectric substrate in which a portion extending outside the waveguide through the notched portion of the waveguide is formed, the substrate being coupled to the end portion of the waveguide;

a plurality of polygonal conductor patterns formed regularly disposed on the face of the dielectric substrate, which is opposed to the interior of the waveguide;

a ground conductor formed on the other face of the dielectric substrate;

an electrically connecting portion electrically connecting the ground conductor and each of the conductor patterns;

an open stub formed flush with the conductor patterns formed on the dielectric substrate; and

a conductor line portion of a microwave transmission line, which is formed on the portion of the dielectric substrate that extends outside the waveguide, the conductor line portion being electrically connected to the open stub.

2. The transition circuit according to Claim 1, wherein

the dielectric substrate is formed of a dielectric multilayer substrate in which a circuit can be formed on other than the faces on which the ground conductor and the conductor patterns portion are formed.

3. The transition circuit according to Claim 1, further comprising: a ground conductor formed between the face on which the other ground conductor is formed and the face on which the conductor patterns are formed, in the portion of the dielectric substrate that extends outside the waveguide; and an electrically connecting portion electrically connecting both of the ground conductors.

4. The transition circuit according to Claim 1, further comprising: a dielectric substrate provided over the face of the dielectric substrate on which the conductor patterns are formed; a ground conductor formed on this dielectric substrate, and further, on the face thereof opposed to the face thereof contacting the conductor line portion formed in the portion thereof extending outside the waveguide; and an electrically connecting portion electrically connecting between the ground conductors including this ground conductor.

5. The transition circuit according to Claim 1, wherein the microwave transmission line is formed of a coplanar line consisting of a conductor line portion formed on the dielectric substrate and ground conductors formed flush with this conductor line portion, along and on both sides of the conductor line portion.

6. The transition circuit according to Claim 1, further comprising:

a conductor line portion of the microwave transmission line, formed on the face opposed to the face on which the other conductor line portion is formed, in the portion of the dielectric substrate that extends outside the waveguide;

two metal conductor portions each having a concavity formed thereon such that a gap is formed between the metal conductor portion and each of these conductor line portions formed on both faces of the substrate, each of the metal conductor portions being provided arranged to encompass the face on which the conductor line portion is formed, in the extending portion of the dielectric substrate; and

an electrically connecting portion electrically connecting these metal conductor portions.

7. The transition circuit according to Claim 1, wherein the open stub is formed of a conductor pattern of a shape having a width changed in a plurality of stages.

8. The transition circuit according to Claim 1, wherein the conductor line portion of the microwave transmission line is formed of a conductor pattern of a shape having a width changed in a plurality of stages.

9. The transition circuit according to Claim 1, wherein the end face of the waveguide is coupled to the face of the dielectric substrate, on which the conductor patterns are

formed, and the transition circuit further comprises: a conductor pattern portion provided on the fringe of the dielectric substrate corresponding to the coupling allowance for coupling the waveguide to the dielectric substrate, and an electrically connecting portion electrically connecting this conductor portion and the ground conductor.

10. The transition circuit according to Claim 9, wherein the electrically connecting portion electrically connecting the conductor pattern portion provided on the fringe of the dielectric substrate and the ground conductor consists of through holes, and further, the electrically connecting portion is disposed at the position at which the face longitudinally traversing the aligned through holes circumscribes the inner wall side of the waveguide.

11. The transition circuit according to Claim 9, wherein the electrically connecting portion electrically connecting the conductor pattern portion provided on the fringe of the dielectric substrate and the ground conductor consists of through holes, and further, the electrically connecting portion is disposed at the position at which the face longitudinally traversing the aligned through holes is spaced away from the inner wall side of the waveguide.

12. The transition circuit according to Claim 9, wherein

the waveguide is formed of a tube having a rectangular cross section; and

the electrically connecting portion electrically

connecting the conductor pattern portion provided on the fringe of the dielectric substrate and the ground conductor consists of through holes, and further, is disposed such that, between the through holes aligned on the fringes thereof corresponding to the two sides of the waveguide opposed to each other in the rectangular cross section thereof and the through holes aligned on the other fringes corresponding to the two sides thereof each making a right angle with the above side, the distances between the face longitudinally traversing the aligned through holes and the inner wall of the waveguide are different from each other.

13. The transition circuit according to Claim 9, wherein the electrically connecting portion electrically connecting the conductor pattern portion provided on the fringe of the dielectric substrate and the ground conductor consists of through holes, and further, the adjacent through holes are uniformly spaced.

14. The transition circuit according to Claim 1, wherein each of the conductor patterns is formed of a conductor pattern having the shape of a regular triangle.

15. The transition circuit according to Claim 1, wherein each of the conductor patterns is formed of a conductor pattern having the shape of a quadrangle.

16. The transition circuit according to Claim 1, wherein each of the conductor patterns is formed of a conductor pattern

having the shape of a regular hexagon.

17. The transition circuit according to Claim 1, wherein the conductor patterns consist of conductor patterns of two or more types of shapes.

18. The transition circuit according to Claim 17, wherein the conductor patterns consist of conductor patterns each having the shape of a regular triangle and conductor patterns each having the shape of a regular hexagon.

19. The transition circuit according to Claim 17, wherein the conductor patterns consist of conductor patterns each having the shape of a quadrangle and conductor patterns each having the shape of an octagon.